PROFILE OF ACCIDENTAL INJURIES AND POISONING IN CHILDREN AND ANALYSIS OF THE PREDISPOSING FACTORS

Dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

In partial fulfillment of the regulations
For the award of the degree of

M.D.BRANCH- VII
PAEDIATRICS

GOVT.STANLEY MEDICAL COLLEGE & HOSPITAL
THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY
CHENNAI, INDIA.

MARCH 2008

Certificate

This is to certify that the dissertation entitled "**PROFILE OF ACCIDENTAL INJURIES AND POISONING IN CHILDREN AND ANALYSIS OF THE PREDISPOSING FACTORS"** is a bonafide original work of **Dr. M.S.MEENAKSHI**, in partial fulfillment of the requirements for **M.D.BRANCH- VII (PAEDIATRICS)** EXAMINATION OF THE Tamilnadu Dr. M.G.R. medical university to be held in March 2008.

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DECLARATION

I, **DR.M.S.MEENAKSHI**, solemnly declare that dissertation titled, "**PROFILE OF ACCIDENTAL INJURIES AND POISONING IN CHILDREN AND ANALYSIS OF THE PREDISPOSING FACTORS"** is a bonafide work done by me at institute of social pediatrics, govt Stanley medical college & hospital during the period of September 2006 to august 2007 under the guidance and supervision of my **prof.DR. SUJATHA SRIDHARAN, M.D, D.C.H,** professor, institute of social pediatrics. The dissertation is submitted to tamilnadu Dr. M.G.R. Medical university, towards partial fulfillment of requirement for the award of **M.D.Degree (Branch-VII) in pediatrics**.

Place: Chennai

Date:

(Dr.M.S.MEENAKSHI)

ACKNOWLEDGEMENT

I owe my thanks to the Dean **Dr.MYTHILY BHASKARAN, M.D.** Govt. Stanley medical college and hospital, for granting permission to conduct this study at Institute of social pediatrics , Govt. Stanley medical college and hospital.

I thank my respected Prof. **Dr.SUJATHA SRIDHARAN M.D, D.C.H,** Professor, Institute of social pediatrics, Govt. Stanley medical college for having been very much supportive and encouraging for conduct of this study.

I also thank **Prof.Dr.G.KARUNAKARAN M.D, D.C.H,** chief pediatric medicine unit III for his invaluable support.

I would like to offer my gratitude to the Registrar, **Dr.C.N.KAMALRATHINAM, M.D, D.C.H,** for his kindness and guidance.

I offer my special thanks to my Asst. **Prof. Dr.M.A.ARAVIND,M.D, D.C.H,** for his invaluable help and suggestions throughout my study.

I also thank my Assistant Professors, **Dr.J.GANESH, M.D., D.C.H., Dr.K.ELANGO, M.D.,D.C.H., Dr.N.THIAGARAJAN, M.D., Dr.K.KUMAR, D.C.H.,** for their critical reviews and suggestions.

I also thank Prof. **Dr.STEPHEN ABRAHAM SURESHKUMAR, M.D., D.C.H., D.M.**, **Professor Paediatric Neurology, Prof. Dr.JOHN SOLOMON, M.D., D.C.H., Professor Paediatric Haematology** for their valuable suggestions.

I also thank **Mr.A.VENKATESAN,** lecturer in statistics, clinical epidemiology unit, institute of social pediatrics, govt. Stanley medical college for his invaluable help in analyzing the values.

I am greatly indebted to all my co- postgraduates who have been the greatest source of encouragement, support, enthusiasms, criticism and friendly concern and timely help.

Last but not the least I owe my sincere thanks and gratitude to all the children and their parents without whom this study would not have been possible.

CONTENTS

INTRODUCTION

A safe, secure, and sustainable environment is a prerequisite for a healthy nation

There is no sorrow, like a parent's sorrow when his or her child has been killed or maimed by injury. The physical and emotional pain that results from injuries to children has spurred many investigators to catalog register and analyze the patterns of childhood trauma**.**

Though the war between nations has come to an end, we are now involved in what has been described as an "uncivil" war. This modern day war kills children with guns, knives, drugs and vehicles. Trauma lurks both developed and underdeveloped nations but in different guises. Approximately 4.5 million children in England and Wales attend an accident and emergency department per year and three die every day as a result of accidents[35.] In USA, accidents cause more deaths between the ages of 1 & 14 than the next six leading causes combined[12].

According to the child accident prevention trust (CAPT), accidents were responsible for one out of every six hospital admissions in the age group of one to fifteen, one out of every five attendances in accident and emergency departments and one out of every eight consultations with family doctors[35.]

There was a prior assumption that understanding the dynamics of pediatric trauma will lead to prevention of trauma. Today we are cognizant of the many facts of pediatric trauma, yet trauma to children continues unabated. The cost to society is beyond measure and the emotional losses are staggering. Trauma to children cannot

be stopped by cerebral understanding; rather the answer to this problem lies in the nation's ability to define its values and priorities.

Hence this study was done to find out the epidemiology, clinical profile, outcome and predisposing factors for pediatric trauma victims in our setting, so that the pediatric emergency trauma care would be intensified and prevention strategies be implemented.

REVIEW OF LITERATURE

Injuries are the most common cause of death during childhood and adolescence beyond the first few months of life & represent one of the most important cause of preventable morbidity and mortality[6].

Definition:

The word “accident” implies an event occurring by chance, without pattern or predictability[6].

The most common accidents referred to hospital consist of burns and Scalds, Road Traffic Accidents, Falls, Poisoning, Drowning, Suffocation & Electric shocks.

Scope of the problem

Injury death:

Injury causes 45% deaths among 1-4 yr children and 3 times more death than the next leading cause, congenital anomalies. For the rest of childhood and adolescence up to the age of 19 yrs, 70% of deaths are due to injuries, more than all other causes combined[6].

The leading cause of unintentional injury deaths in childhood were motor vehicle accidents (46%) with pedestrian injuries accounting for half of these[16]. Other leading causes of death included suffocation & foreign bodies(14%), fires & flames(9%), drowning & submersion(9%), falls (5%) & poisoning (3%).

For every child who dies from an injury many more are admitted to hospital, attend accident & emergency department or general practitioners. Walsh et al conducted a study at new castle in 1990 & found that there were 6 deaths among children under age 16yrs, 904 hospital admissions, and 11,682 accident & emergency dept attendances in a population of 54,000[46].

Non fatal injuries:

20-25% children & adolescents receive medical care for an injury each year in a hospital emergency dept & at least an equal number are treated at physician's office. Of these 2.5% require inpatient care & 55% have short term temporary disability from their injuries[6]. Falls are the leading cause of nonfatal injuries[6, 36] followed by burns & scalds & poisoning in the 0-4 yrs age group[27].

Risk factors for childhood injuries:

Accidents are the end result of innumerable factors[14,28]. They include age & sex of the child, his personality & intelligence, the result of imitation of others and the example set by his parents. They are related to his stage of development, his mobility, ability to reach for objects, to climb, his desire to learn & explore and above all his inability to know from experience the consequences of what he is doing.

Accidents are liable to happen when the mother is at work, or having a baby, and or attending to someone who is ill, when her attention is momentarily distracted by someone telephoning or coming to door or when she is taking tranquilizing drugs which reduce her level of alertness. Other factors include hunger, fatigue, over activity, illness at home, parental failure to understand what to expect of children at different ages, change in environment (e.g. new house, a holiday), imitation of

parents, anger directed against parents, negativism & emotional deprivation. Pica is a factor leading to poisoning.

Parents have to balance the need for protection against the need for the child to learn, beginning with absolute protection at birth, finishing with nearby complete independence by 10 yrs of age. Overindulgence and lack of discipline on the one hand & excessive strictness on the other hand, both lead to accidents.

Toddlers are at greater risk for burns, drowning, falls & poisoning. Young school aged children are at greater risk for pedestrian injuries, bicycle injuries, motor vehicle occupant injuries, burns & drowning. During teenage yrs there is a markedly increased risk from motor vehicle occupant trauma & a new risk from intentional trauma[6]. Males have a higher rate of injuries than females[6, 13].

Poverty is one of the most important risk factors for childhood injuries. Children from poorer background are 5 times more likely to die as a result of accident than children from better off families[36]. Robert et al 1997, in his study showed that , the death rate of children from social class V , for fire & flames were 16 times more than children from most affluent background & 5 times more for pedestrian injuries, this difference also exists for cyclist injuries, falls & poisoning[34]. Other factors include single parent families, teenage mother, family stress & multiple siblings.

Falls:

Falls are by far the most common accidents at home[30]; they account for 44% of all accidents in children[36]. Most falls involve tripping over at the same level. Most serious consequences result from falls between 2 levels, such as falling out of a pram,

high chairs & falling from bed. The worst injuries are sustained when a child falls from greater height or lands on something hard, sharp or hot[36].In one study 68% were due to falls down steps as a result of baby walker[24]. A study of 52 injuries from bunk beds showed that in 42% there were no protective rails, in 35% the fall occurred during sleep, 35% during play and in 15% while into & out of bed[38].

As with most home injuries, falls were common in children between the age group 0-3 yrs & boys outnumbered girls[11, 19]. 50% sustained injury to the face & 10% suffered concussions[19]. Head injury is the most common cause of death in children aged 0-15 Yrs [4, 39]

Road traffic accidents:

RTA accounts for the largest no. of accidents occurring outside home & for more no. of injury deaths[11].Road accidents include collision with a car (by pedestrian or bicyclist), accidents to the occupants of a vehicle and bicycle mishaps[3]. Of 227 new admissions in accident and emergency dept of Sheffield children's hospital in a 9 month period, 169 were accidents to pedestrians, 31 to cycle accidents & 27 to children in cars[35].

Pedestrian injuries:

Pedestrian injuries are one of the most common causes of traumatic deaths in children 5-9yrs[6] & are the fourth leading cause of nonfatal injury hospitalization[26]. Many of the injuries to toddlers & preschoolers are 'non traffic' meaning they occur in places like driveways & parking lots instead of on public roads[37, 45]. Boys outnumber girls as pedestrian fatalities by 2:1.

Injuries most commonly occur during the time of 8-9AM & 3-6PM. This mid to late afternoon was the most common time for both weekdays & weekends, suggesting children at play and children getting to & from school by walk or to buses that take them to school. Nearly 30% of injuries were due to children being hit while crossing the street in a cross walk[26].

Pedestrian injuries resulted in an average of 2 days of hospital stay, nearly 32% hospitalization for lower extremity injuries, 87% of them being fractures & one quarter of non fatal hospitalization was for a traumatic brain injury. The risk of pedestrian injuries is greater in the neighborhood with high traffic values, speeds greater than approximately 25mph, absence of play space adjacent to the home, household crowding & low socioeconomic status.

Bicycle injuries:

Boys are more likely injured in bicycle accidents than girls & the risk of bicycle injuries increases after the age of 10 with preschool children having the fewest and 10-14yrs old the greatest[16].

The causes associated with bicycle injuries are losing control on a hill or a corner, skidding on gravel, hitting on object(dog , car) , a hole in the road, doubling(having another child), speeding, slipping off(handlebars, saddle, pedal), mechanical faults & tricks(speeding, riding on one wheel, showing off). In one study by Illingworth et al, in 300 children with bicycle related injuries, 40 had fractures, 21 had concussion, and 18 had broken teeth & 131 injuries above the neck[21].

Motor vehicle occupant injuries:

Injuries to motor vehicle occupants are the predominant cause of motor vehicle deaths, in children & adolescents with the exception of 5-9yrs old in whom pedestrian injuries predominate. Proper use of restraint is the single most effective method for preventing serious & fatal injury[7].

Management of multi trauma victim:

Trauma is classified by the number of significantly injured body parts (one /more), severity of injury (mild, moderate or severe) and the mechanism of injury (blunt/ penetrating). In children blunt trauma predominates.

A multidisciplinary trauma team is the most effective in the care of an injured child. Members of the team include a team leader (Surgeon/ Pediatrician), surgeons, emergency medicine physicians, surgical sub-specialists, trauma nurses & paramedical personal.

Scoring systems:

Scoring systems have been developed to predict the patient outcome[18].

Pediatric trauma score:

	+2	+1	-1
Size	>20kg	10-20kg	<10kg
Airway	normal	maintainable	unmaintainable
Systolic BP	>90mmHG	50-90mmHG	<50mmHG
CNS	awake	obtunded	comatose
Open wound	none	minor	major
Skeletal	none	closed fracture	open/multiple

A total of +12 score indicates no injury & -6 indicates fatal injuries. An inverse linear correlation exists between pediatric trauma score and mortality.

Primary survey:

During the primary survey the physician quickly assesses the victim of any life threatening injuries. Therefore the primary survey addresses the ABCDE; A- airway, B-breathing, C- circulation, D- neurological deficit, E- exposure of the patient & control of environment.

Airway & cervical spine:

The cervical spine should be immobilized in neutral position using a stiff collar, head blocks & tape or cloth across the forehead, torso and thighs to restrain the child to a rigid back board. Secretions of mouth like blood & vomitus should be suctioned out. If it is necessary to open the airway, a jaw thrust without a head tilt is recommended. This minimizes cervical spine motion. Oro-pharyngeal airway in an unconscious child and naso-pharyngeal airway in a semi-conscious child may be inserted. If all these do not maintain the airway then endotracheal intubation is indicated.

Breathing:

Assessed by counting RR, visualizing the chest wall motion, depth & use of accessory muscles & auscultation for breath sounds. Also look for cyanosis and Oxygen saturation. If breathing is inadequate, bag-valve-mask ventilation is to be initiated followed by endotracheal intubation.

Circulation:

Signs of hypo volumic shock include tachycardia, weak peripheral pulses, delayed capillary refill, cool mottled skin & altered mental status. An individual may lose upto 25% of blood volume before BP declines. With losses greater than 25% hypotension ensues & greater than 50% can cause severe hypotension and may become irreversible.

Bleeding is managed by applying direct pressure to the external hemorrhage site. Intravenous access is established thro central vein or peripheral vein or interosseus route. Aggressive intravenous fluid resuscitation is started with 20ml/kg of

isotonic crystalloid solution such as RL/NS. 3 boluses may be repeated if shock persists.10-15ml/kg of packed RBCs may be transfused for persistent shock. Surgery to stop hemorrhage is usually indicated if shock persists despite the above measures.

Neurological deficit:

Evaluation of the level of consciousness is done by determining the pupil size and reactivity, using GCS/AVPU scale. Head injuries account for 70% of pediatric blunt trauma deaths. Minimize secondary brain damage by ensuring adequate oxygenation, ventilation & perfusion and maintaining normal intracranial pressure and maintaining cerebral pressure.

Exposure/environment control

All the clothing should be cut away to reveal any injuries. Child may be hypothermic, so it should be treated with radiant heaters, heated blankets and IV fluids.

Secondary survey

During secondary survey, the physician completes detailed head to toe physical examination.

Head trauma

A GCS/pediatric GCS score is assigned to every child. Patients with low GCS score 6-24 hrs after injury have poorer prognosis. Head CT scan without contrast medium enhancement has been the investigation of choice. Diffuse cerebral injury

with edema is a common finding on CT scan. ICP monitoring should be done in children with low GCS <8 or with abnormal CT.

Cervical spine trauma

Bony injuries occur mainly from C1-C4 in children <8yrs & in upper & lower cervical spine are equally involved in older children. SCIWORA (cervical spinal cord injury without radiological abnormalities) occurs in approximately 20% of children with cervical spinal injuries. MRI is helpful in patients with SCIWORA. Initiating high dose IV methyl prednisolone within 8hrs of spinal cord injury improves motor outcome at 1 yr and is the standard therapy[6].

Thoracic trauma

Chest injuries with fatal cardio pulmonary compromise[25] are

- Tension pneumothorax
- Open pneumothorax
- Massive hemothorax
- Pericardial tamponade
- Flail chest
- Massive pulmonary contusion

Liver & Abdominal trauma

Spleen contusions, Hematomas & Lacerations account for the majority of intra abdominal injuries due to blunt trauma. The Kidney , pancreas & duodenum are relatively spared. Examine for distension & bruises, palpate for tenderness & perform a rectal examination. An abdominal CT scan with IV contrast medium enhancement

rapidly identifies structural & functional abnormalities & is the investigation of choice. Indications for laparotomy include persistent hemodynamic instability, the need for repeated transfusions (~ 40ml/kg) and bowel perforation.

Lower genito urinary trauma

Perineum should be inspected, pelvic stability assessed and rectal examination should be performed. Scrotal or labial echymosis, blood at urethral meatus, gross hematuria & spuriously positioned prostate in adolescent male indicate urethral injury. A pelvic injury is also a marker of potential genito urinary injury. Retrograde cysto-urethrogram & CT scan pelvis & abdomen are used to determine the extent of injury.

Extremity trauma

All limbs should be inspected for deformity, swelling & bruises, palpated for tenderness & assessed for active & passive range of motion, sensory function & perfusion.

Radiologic & laboratory evaluation

Routinely required investigations include X-ray lateral cervical spine, X-ray chest AP view, X-ray pelvis AP view, ABG, complete blood cell count, electrolytes, blood glucose, blood urea nitrogen, creatinine, amylase, liver function tests, prothrombin & partial thromboplastin time, blood typing & cross matching & urinalysis.

Prevention

1. Have a safety gate at the top & bottom of stairs.
2. Children should not be allowed to play on stairs.

3. Baby must never be left alone in baby chairs.
4. Children should be taught where to cross the road safely
5. Use of car seat belts & cycle helmets should be emphasized.

Burns

Burn injuries are the 3rd leading cause of death in children younger than 5yrs[22].Scalds from boiling hot liquids cause most minor & major burns in children 1-5yrs old & boys were burned twice as often as girls. Most injuries are due to toddlers pulling a pot of boiling liquid off the stove or a bathtub mishap. In children older than 5yrs, flames, chemicals & electrical burns constitute the prime cause in that order.

Because small children have three times the surface area to body mass ratio of adults, the evaporative water & heat loss in children is greater, so that fluid requirements are also increased.

Classification of burns

First degree burns-Involves only the epidermis & are characterized by swelling, erythema & pain. Pain resolves in 48-72hrs.

Second degree burns- Involves the entire epidermis and a variable portion of the second layer. Vesicle & blister formation are characteristic of second degree burns.

A superficial second degree burns is extremely painful because a large no. of remaining viable nerve endings are exposed. Superficial 2nd degree burns heal in 7-14 days as epithelium regenerates in the absence of infection. Mid level to deep 2nd degree burns heals spontaneously if kept free of infection. Pain is less as fewer nerve endings remain viable.

Third degree or full thickness burns-These destroy the entire epidermis & dermis, leaving no cells to repopulate the damaged area. Wound heals only by wound contraction or skin grafting.

Indications for hospitalization

- Burns greater than 15% BSA.
- High tension wire electrical burns.
- Inhalation injury regardless of the size of BSA involved.
- Inadequate home situation.
- Suspected child abuse or neglect.
- Burns to hand, feet, face & genitalia.

Care of minor burns

The goals of minor partial thickness burns are to minimize the problems of pain, superficial infection, bothersome wound drainage & prolonged convalescence.

1. Application of cold towels soaked in ice water.
2. Blisters to be left intact. Debridment of blisters is probably the most preferred approach for more extensive burns.
3. Closed dressing may be applied by the traditional method of applying a layer of non adherent petrolatum gauze followed by bulky gauze dressings changed everyday or application of topical antibacterial cream such as silver sulphadiazine over the wound, then cover it with a relatively light dressing changed every 12-24 hrs.
4. Burns of face & trunk are left open.

Care of major burns

Major burns are defined as burns requiring hospitalization. Traditionally major burns have been defined as burns involving > 20% BSA in infants, > 30% BSA in older children or associated with other forms of life threatening trauma.

Airway management- Airway patency must be ensured & endotracheal intubation done , if upper airway patency is jeopardized, gas exchange or work of breathing indicates need for mechanical ventilatory support or mental status is severely compromised to threaten airway.

The diagnostic gold standard of inhalation injury is probably bronchoscopy, but h/o burn in closed space, physical findings of singed nasal hair, carbonaceous sputum or elevated carboxyHB may all indicate inhalation injury. X-ray evidence of atelectasis or widespread infiltrates are usually not evident until 12 hrs or more.

Fluid resuscitation-The primary goal of fluid resuscitation is to preserve & restore tissue perfusion without producing excessive edema beyond that is obligatory. It is known that greatest loss of fluid from capillary bed is during the first 4hrs after injury & that maximum accumulation of edema is in the first 12-24hrs in extensive burn injuries.

The modified BROOKE formula for calculation of fluid is as follows:

FIRST 24 HRS – RL SOLUTION 3ML/KG / %BSA (25-35% BURNS) & 4ML/KG /%BSA (>35%BURNS).

SECOND 24 HRS - 5% DEXTROSE IN 0.45 ML SALINE SOLUTION: ONE HALF TO THREE QUARTERS OF FIRST 24 HR REQUIREMENT OR 5% ALBUMIN SOLUTION AT 0.5ML/KG/ %BSA.

Guidelines for fluid replacement-

Hourly urine output

Vital signs, central venous pressure

Clear sensorium

Adequacy of peripheral circulation

Absence of lactic acidosis, hypothermia

Hct value, Sr.electrolytes, PH, glucose value.

Estimation of fluid loss beyond 48 hrs post burn- (evaporative water loss phase)

- Daily maintenance: 5% dextrose/ 0.2N saline according to individual needs.
- Evaporative water loss: 5% dextrose/ 0.2N saline solution 1-2ml/kg /% BSA /24hrs.
- Potassium supplementation as needed.
- Blood transfusion as needed.
- Guidelines for fluid needs in this phase
- Daily body weight
- Daily urine volume & specific gravity.
- Values of Sr.sodium, potassium, urea, Hct & osmolality.

Blood replacement

Thermal injury to the skin results in red blood cell loss in proportion to the size & depth of burn. Administration of blood is indicated if associated blood loss from other injuries is present.

Nutrition

The best route of nutritional supplementation is enteral feedings than parenteral route due to less infection. The aim is to provide an intake of 100Kcal/kg/24hrs & 23g/kg/24hrs of proteins.

Pain control

Pain is controlled with IV morphine or oral morphine , codeine or meperidine before any procedures or dressings.

Wound care

Escharotomy is indicated for circumferential full thickness burns of extremities & suspected peripheral circulatory compromise. Done best during the first 8-24 hrs after injury.

Infection control

Topical antibacterial agents like 1% SSD or 10% mafenide acetate are effective. Systemic antibiotics is used with infection of lungs, urinary tract or elsewhere or when invasive infection is detected in the burn wound by biopsy with a quantitative bacterial count of >105 organisms per gram of tissue. Pseudomonas is less common as a cause of infection. The opportunistic organisms such as enterobacter cloacae, providencia stuartii, serratia marascens, candida, phycomycetes & occasional viruses & more recently multi drug resistant staph.aureus has become more common22 .

Skin grafting

Immediate auto grafting is done in the priority order as follows: face & neck, hands, arms, feet, legs & trunk.

Prevention

- Don’t allow the child to play with fire or matches.
- Never leave electric iron plugged.
- Never leave hot teapots near the edge of table.
- Never pass hot tea or fluid in front of children.
- Always turn pan handles away from the front of stove.

Poisoning

The reported incidence of poisoning in children varies from 0.3-7.6% in various studies[5, 42]. More than 50% occurred in children 5yrs of age or younger. Almost all of these exposures is unintentional & reflect the propensity for children of this age group to put virtually anything in their mouth. More than 90% of toxic exposures in children occured in the home & most involve only a single substance. Ingestion is the most common route of poisoning exposure & dermal, ophthalmic & inhalational routes occurring in about 6 cases each. Most common poisoning in our setup is kerosene[5,42] followed by pesticides, corrosives & food poisoning.

Management plan for poisoning:

Initial medical care-

Initial attention should focus on life support especially cardio respiratory care. Initial treatment of shock, dysrrhythmias & seizures is the same as for any other critically ill child.

Preventing absorption-

Dermal & ocular decontamination can be accomplished by flushing the affected area with tepid water. A minimum of 10 min is recommended for ocular exposure. Soap & water can be used for dermal exposure. For inhaled toxins move the patient to fresh air & administer oxygen. Absorption of liquid drug products from stomach is within 30mts & solid forms within 1-2hrs.

Emesis

The only emetic routinely used is syrup of ipecac. The onset of emesis is usually 20-30mts after dosing. The recommended dosing is 10ml for infants 6-12 months of age, 15ml for children aged 1-12yrs & adults. Ipecac induced emesis is contraindicated after the ingestion of caustics, hydrocarbons & agents likely to cause rapid CNS & CVS symptoms.

Gastric lavage

This technique involves placing a tube into the stomach to aspirate contents followed by flushing with aliquots of fluid usually NS.

Activated charcoal

Activated charcoal has a larger adsorptive surface area. In vitro 10g of activated charcoal adsorbs 1g of toxin. Usual dose is 10-30g for a child & 30-100g for an adolescent. Some toxins including heavy metals, iron, lithium, hydrocarbons, cyanide & low molecular weight alcohols are not significantly bound to charcoal.

Cathartics

Cathartics are commonly used in conjunction with activated charcoal to hasten the clearance of charcoal-toxin complex. Commonly used cathartics are sorbitol, magnesium sulphate & magnesium citrate.

Whole bowel irrigation

This involves instilling large volumes of polyethylene glycol electrolyte solution into the stomach to clean the entire GIT. This is successfully used to remove slowly absorbed products like iron or sustained release products.

Enhancing elimination of toxin:

Diuresis

Increasing the PH of the urine with soda bicarbonate increases the elimination of weak acids such as salicylates & Phenobarbital. Alternately, acidifying the urine increases the elimination of weak bases such as amphetamines & phencyclidine. This technique is termed ion trapping.

Dialysis

Hemodialysis & peritoneal dialysis has been used successfully to treat poisoning by methanol, ethylene glycol & large symptomatic ingestions of salicylate & theophylline. Dialysis is not useful for drugs that are either highly protein bound or has a large volume of distribution.

Hemoperfusion

It is a dialytic technique in which blood is passed thro a column of activated charcoal & resin. It has been used to treat large ingestions of salicylates, theophylline & few other selected agents.

Antidotes

The antidotes may be physiological, chemical or physical. Chemical antidote combine with the poison & render it innocuous. Physiological antidotes counteract the effects of the poison on the metabolism & physiological functions of the body & thus prevent harmful effects. Physical antidote prevents the contact of poisonous substance with target organ or adsorbs the toxic compounds thus preventing their toxicity. Some of the antidote includes atropine & pralidoxime for organophosphorous poisoning, acetyl cysteine for paracetamol, flumazenil for benzodiazepines, naloxone for opioids, amyl nitrite for cyanides & so on.

Prevention

- Never leave medicines in child's reach.
- Cleaning agents, drugs & fuels should be locked & not to be stored in drinking bottles.
- Never store inedible products in shelves.

Drowning and near drowning

Death within 24hrs of submersion is termed Drowning and survival after more than >24hrs is termed Neardrowning, regardless of whether the victim later dies or recovers. The World Health Organisation estimated the 1998 worldwide drowning mortality to be 8.4/100,000. As a cause of death globally, Drowning ranks 11th for children < 5 yrs and 4th for children aged 5-14 yrs old.Risk factors for drowning include children <5yrs old and second highest being 15-19 yrs old and males predominate in all ages.

Children younger than 1yr drowned mostly in domestic sites (78%) predominantly in bath tubs & 1-4 yrs old in artificial pools (55%). Children may also

drown in buckets, toilets, washing machines, sinks & other common areas containing water. Concomitant medical conditions like epilepsy & mental & motor disabilities carry an increased risk of drowning.

Pathophysiology & clinical features

After submersion in a liquid medium, suffocation & asphyxia may occur with or without pulmonary aspiration. Within few minutes, hypoxia & ischemia can rapidly lead to irreversible multi system injury & eventually death. Hyperglycemia may exacerbate CNS injury. Pulmonary aspiration leads to surfactant deficiency, V-Q mismatch, hypoxia & pulmonary insufficiency. Hyper natremia & hemo concentration occurs with sea water ingestion & hemodilution due to fresh water ingestion which may also be due to SIADH. Hypothermia (core temperature <35deg.C) is common after submersion. Hypothermia occurs as children have increased body surface area to mass ratio & decreased subcutaneous fat.

Treatment

Two groups may be identified based on the responsiveness at the scene.

Category A- children who require minimal amounts of resuscitation at the scene commonly have good outcomes & low incidence of complications.

Category B- children in cardiac arrest, who require aggressive & prolonged resuscitation & have a high risk of multi organ system complication, major neurologic morbidity & death.

The ABC's – airway, breathing & circulation of emergency resuscitation should be instituted. Sellick's maneuver may be used to prevent aspiration of gastric

contents during positive pressure ventilation. Cervical spine injuries be thought & spine immobilized. If apnea, cyanosis, hypoventilation & labored breathing persist, endotracheal intubation & application of PEEP may improve the oxygenation. Rewarming measures should be started after measuring the core temperature, by removing the damp clothes, drying the skin, applying warm blankets, warm environment, warmed IV fluids & humidified oxygen. External rewarming measures be applied when core temp <34 deg C.

Assess blood glucose periodically, if hypoglycemic, 0.5-1g/kg dextrose given as 10%solution & if hyperglycemic, avoid dextrose containing solutions initially.

Neurologic management

The most effective neuro intensive care measures in near drowning are the rapid restoration of adequate oxygenation, ventilation & perfusion & avoid hypo/ hyper glycemia. Fever & seizures are to be controlled as they increase oxygen requirement.

Prognosis:

Scoring & classification systems as well as individual factors have been used to predict the outcome in near drowning[47]. These are

1. Historical variables such as submersion duration, interventions at the scene & patient temperature.
2. Treatment variables such as need for CPR in the emergency department, apnea and pulselessness, resuscitation duration, GCS and progression, papillary responsiveness and brain stem reflex.
3. Laboratory values like PH and glucose.

Prevention:

- Never leave water in a bucket in a floor
- Never leave the child alone in bath or to swim.
- Not to swim after a large meal
- Provide fence for swimming pools & artificial ponds & garden lily pond.

Foreign bodies

The proclivity of infants & children to place all manner of foreign bodies into their mouths, nose & ears frequently results in problems.

Ear/ nose foreign body

Insects may invade the external auditory canal, small objects such as peas, peanuts & paper may be inserted by the child. Draining, fever & bleeding may be seen. FB may be removed by irrigation with tepid water, using a water pik or a cerumen scoop, loop or bayonet forceps.

Laryngeal & tracheal FB

Objects like peanut, popcorn or small objects may be aspirated. The stridor, wheezing & retractions that follow draws attention immediately to the possibility of aspiration. If the FB has lodged within the glottic opening, the child struggles to take in enough air with which to cough. At this point, Heimlich maneuver may dislodge the FB & restore the airway. Manual dislodgement of larger objects by an adult may be effective.

Most aspirated FBs pass thro the glottis & lodge in a bronchus or one of its branches. In this case a child often wheezes & continues coughing. The radiolucent FB is only evident on X-ray due to the ball valve effect which prevents egress of air from the involved lung. The ipsilateral diaphragm may be depressed & the intercostals spaces relatively widened by the effects of air trapping.

Esophageal FBs

FBs are commonly swallowed. Some lodge in the esophagus, the narrowest part of GIT being the cricopharyngeus muscle or superior constrictor of the esophagus. Anomalies of the esophagus can also cause the FB to lodge, including repaired esophageal atresia, vascular rings, esophageal webs & duplication cysts. The most common symptoms of a FB in esophagus are drooling, dysphagia & pain. X-ray long axis of a tracheal FB is vertically oriented whereas the axis of esophageal FB is transverse. Radiolucent objects are made visible by judicious use of contrast agents or USG.

The advent of small batteries has added the dilemma of caustic ingestion to that of FB, when electrically exhausted. If there remains life in the battery, the electrical

current may add to the local tissue damage. Ingested batteries that are not below the stomach will be removed. The advent of an integrated pediatric endoscopy system by Karl Storz has made retrieval of FB easier.

Gastro intestinal FBs

Approximately 95% of the ingested FBs reach the stomach & pass the remainder of GIT without causing obstruction. Exceptions include long objects such as tooth brush, an elongated key or a pencil. These objects are likely to get obstructed at the duodenum or ligament of TREITZ.

BEZOARS are FBs that may obstruct the stomach or small intestine. They are composed of hair (trichbezoar), vegetable matter (phytobezoar), neonatal casein curd (lactobezoars) & are more common in emotionally disturbed & retarded children.

Prevention

- Children should not be allowed to run with food in mouth.
- Discard broken toys and batteries immediately.
- Inhibit the practice of catching peanuts by mouth after throwing in air.

Child abuse

Child abuse was brought to the attention of modern society in 1946 by Caffey, who described a syndrome of multiple long bone fractures in infants associated with subdural haematoma. The battered child syndrome has many manifestations, including physical and mental abuse, nutritional & hygienic neglect, sexual abuse, delayed treatment of illness & neglect of a child's safety. Most commonly the victims of abuse are younger than 2 yrs, when they have limited ability to communicate. More boys than girls are injured but far more girls are sexually abused. Premature children,

children with complicated medical problems, stepchildren & children from low socio economic group are at particular risk. In three fourth of cases one or both parents are involved, mostly young parents under extreme financial & social stress.

Diagnosis

Parents may bring the child for an injury that occured several days previously and may explain the injury spontaneous and unwitnessed. Almost always there is marked discrepancy between the history offered & the manifestations of injury. Parents may make visits to many different emergency departments to avoid detection by the same facility more than once[23].

Patterns of injury

The characteristic patterns of injury in abuse in the order of frequency are

- Repetitive soft tissue injuries
- Contusions, abrasions, lacerations, burns.
- Evidence of repetitive fractures
- Solitary head injury/ subdural hematoma
- Visceral injuries.

Musculo skeletal manifestations of abuse[10]

- Spiral fractures attributed to falls
- Sub periosteal calcification with no h/o injury
- Multiple fractures in various stages of healing.
- BUCKET-HANDLE fractures or epiphyseal metaphyseal separation with fragmentation from pulling or shaking forces.

- Unexplained fractures associated with chronic sub dural hematomas.

Other manifestations include failure to thrive with marked nutritional deficiency & sexual abuse in 10-12 yrs old girls.The families are rehabilitated by means of long term psychiatric care and social service involvement.

Injury prevention

Injury prevention is described at various levels:

Primary prevention

Aimed at eliminating a trauma incident such as stop lights at intersections, window guards to prevent falls & fences around swimming pools.

Secondary prevention

It is the attempt to decrease the severity of injuries that have occurred.

Tertiary prevention

IT is aimed at reducing the consequences of injury after the injury has occurrence.

According to Haddon, there are three main factors in injury occurrence:

- The injured person or host
- The injuring mechanism or vehicle
- The environment in which the injury occurs

Implementation of prevention strategies has been done using the four "E"s: education, enforcement, engineering & economics.

Education- knowledge supports a change in behaviour such as drunk driving and use of seat belts.

Enforcement- Implementations of law mandating a preventive action.

Engineering- Engineering changes like incorporation of air bags may have greatest preventive effects.

Economic incentives- Efforts made by the government in laying smooth roads etc.

AIM OF THE STUDY

- To study the epidemiology, clinical profile and outcome of children with accidental injuries and poisoning.

- To analyze the factors predisposing to accidental injuries in children.

MATERIALS AND METHODS

Study design: Prospective cohort study.

Study place: Institute of social pediatrics, Stanley medical college, Chennai.

Study period: September 2006- August 2007.

Sample size: 180 cases.

Study group: Children in the age group of 0 – 12 yrs.

Inclusion criteria:

- All children admitted in the Institute of social pediatrics with H/O accident related morbidity.
- Children admitted in the dept of neurosurgery, pediatric surgery, plastic surgery and orthopedics with H/O accident were included.
- Children attending the outpatient dept & pediatric casualty of Institute of social pediatrics with major injuries requiring investigation & intervention were included.

Exclusion criteria

- Newborns with birth injuries were excluded.
- Children with suicidal tendencies and assault.
- Children with pre-existing morbidity in whom the accident was a precipitating event or in whom an incidental one after a trivial trauma.
- Children admitted for complication of an old injury.

- Children attending outpatient department with minor injuries not requiring any intervention.

Methodology

- Children with accidental injuries due to falls, RTA, burns, drowning, poisoning, foreign body and electrocution were included in the study.
- After selecting the patient, a detailed preset questionnaire was filled regarding the situations of accident.
- The child was investigated appropriately and treated according to standard protocols.
- Admitted children were followed up till discharge or death and outcome studied.
- Children treated as outpatients were followed up for a period till recovery.
- Further details of family, socio economic class were obtained from the person accompanying the child.
- All the details were analysed using appropriate statistical methods.

Statistical methods used

- Socio demographic variables are given in frequencies and their percentages.
- Days of hospital stay and age of children are given in mean and standard deviation.
- Association between types of accident, type of injuries with demographic variables was analyzed using pearson chi-square test.
- Day of accident, time of accident, and place of occurrence & working day or holiday were analyzed using one sample chi-square test.

- Prevalence of type of accident was given in proportion with 95% confidence interval.
- Risk factors for accident were identified using multivariate logistic regression analysis.
- P value <0.05 were taken as significant.

OBSERVATION AND RESULTS

Total no of cases registered in our study was 180, during the period of Sep 2006 to Aug 2007. Of those cases 56(31.1%) were treated as outpatients and 124 (68.9%) were treated as inpatients.

Table I-Age distribution

Age Group	N	%
< 3 yrs	**68**	**37.8%**
3- 6 yrs	**51**	**28.3%**
6-9 yrs	**35**	**19.4%**
9-12	**26**	**14.4%**

Among the 180 cases, 68(37.8%) were < 3 Yrs,51(28.3%) belonged to 3–6 Yrs, 35(19.4%) and 26(14.4.%) of age group 6 – 9 Yrs and 9 – 12 Yrs respectively.

Table II-Sex distribution

SEX	**N**	**%**
Male	**108**	**60.0%**
Female	**72**	**40.0%**

Of the total no of cases, 108 cases (60%) were males and 72(40%) were females.

Table III – Type of accident

Type of accident	Age group of children										Chi square test
	< 3 yrs		3- 6 yrs		6-9 yrs		9-12		Total		
	n	%	n	%	n	%	n	%	n	%	
Fall	21	30.9%	16	31.4%	15	42.9%	7	26.9%	59	32.8%	P=.08NS
RTA	6	8.8%	15	29.4%	8	22.9%	11	42.3%	40	22.2%	P=.20NS
Burns	5	7.4%	3	5.9%	3	8.6%			11	6.1%	P=.69NS
Drowning	2	2.9%					1	3.8%	3	1.7%	P=.56NS
Poisoning	27	39.7%	6	11.8%	3	8.6%	2	7.7%	38	21.1%	P=.001 SIG
FB	2	2.9%	9	17.6%	1	2.9%	2	7.7%	14	7.8%	P=.008 SIG
Others	5	7.4%	2	3.9%	5	14.3%	3	11.5%	15	8.3%	

Among the accidents falls accounted for 59 cases (32.8%) ,followed by RTA 40(22.2%), poisoning 38(21.1%), FB 14 (7.8%), burns 11 (6.1%), drowning 3 (1.7%) and others 15(8.3%) in the decreasing order .Falls were higher in the age group of 6 – 9 Yrs with 15 cases (42.9%) and RTA common in 9 – 12 Yrs with 11(42.36 %) cases. Poisoning was common in the age group of less than 3 Yrs with 27 cases (39.7%) and FB in 3 – 6 Yrs with 9 (17.8%).

Details of accident

Among falls, fall by tripping at the same level accounted for 17(28.8%) cases, from one level to another 17 (28.8%), stairs 14 (23.7%), terrace 5 (8.5%) and from moving objects 6 (10.2%).

Table IV Details of accident RTA

doa-RTA	Age group										Chi - square test
	< 3 yrs		3- 6 yrs		6-9 yrs		9-12		Total		
	n	%	n	%	n	%	n	%	n	%	
Pedestian Injuries	4	66.7%	7	46.7%	6	75.0%	3	27.3%	19	47.51%	$\chi 2=12.5$ P=0.05 SIG
Bicycle Injuries					1	12.5%	4	36.4%	5	12.5%	
Vehicle occupant	2	33.3%	8	53.3%	1	12.5%	4	36.4%	16	39.5%	

AMONG THE ACCIDENTS PEDESTRIAN INJURIES WERE COMMON ACCOUNTING FOR 19 CASES(47.5%) FOLLOWED BY MOTOR VEHICLE OCCUPANT INJURIES 16(39.5%) AND BI-CYCLE INJURIES 5 (12.5%) . PEDESTRIAN INJURIES WERE MORE COMMON IN THE AGE GROUP OF 6 – 9 YRS ACCOUNTING FOR 6 CASES (75%) FOLLOWED BY < 3 YRS ACCOUNTING FOR 4 CASES (66.7%).MOTOR VEHICLE OCCUPANT INJURIES WERE COMMON IN THE AGE GROUP OF 3 – 6 YRS WITH 8 CASES (53.3%).THERE IS A SIGNIFICANT ASSOCIATION BETWEEN THE TYPE OF INJURY AND AGE GROUP . THIS IS CALCULATED USING PEARSON CHI-SQUARE TEST.

Table V – Details of accidental poisoning

POISONING	Age group										Chi-square test
	< 3 yrs		3- 6 yrs		6-9 yrs		9-12		Total		
	n	%	n	%	n	%	n	%	n	%	
Hydro Carbon	15	55.6%	1	16.7%					16	42.1%	$\chi 2=30.52$

Chemicals	**8**	**29.6%**	**2**	**33.3%**	**1**	**33.3%**			**11**	**28.9%**	**P=0.001 SIG**
Tablets	**1**	**3.7%**							**1**	**2.6%**	
Corrosives			**1**	**16.7%**	**2**	**66.7%**			**3**	**7.9%**	
Others	**3**	**11.1%**	**2**	**33.3%**			**2**	**100.0%**	**7**	**18.4%**	

OF ALL THE POISONING CASES HYDROCARBON POISONING(KEROSENE) ACCOUNTED FOR 16 CASES (42.1%), CHEMICAL POISONING 11 CASES (28.9%), 1 CASE (2.6%) OF TABLET POISONING, 3 (7.9%) CASES OF CORROSIVE POISONING AND OTHERS 7 CASES (18.4%) OF WHICH 2 CASES WERE ODUVANTHALAI LEAF POISONING, 2 CASES OF MOSQUITO COIL, 1 CASE OF MATCH STICK, 1 CASE OF COPPER SULPHATE AND 1 CASES OF ALCOHOL INGESTION.

Table VI Details of accident others

Details of accident		**n**	**%**
BURNS	**Fire works**	**3**	**27.3%**
	Scald	**8**	**72.7%**
NEAR DROWNING	**Bath tub/Bucket**	**1**	**33.3%**
	Water storage	**2**	**66.7%**
FOREIGNBODY	**FB swallowed**	**9**	**64.3%**
	FB ear/Nose	**4**	**28.6%**
	FB Aspiration	**1**	**7.1%**
Others	**Electrocution**	**3**	**20.0%**
	Wall collapse	**3**	**20.0%**
	Hit by moving object	**6**	**40.0%**
	Sharp object	**1**	**6.7%**

	Others	**2**	**13.3%**

In our study fire works/house fire burns accounted for 3 cases (27.3%) and scalds due to hot water baths /drinks for 8 cases (72.7%).Drowning into bath tubs or bucket was seen in 1 case (33.3%) and into storage tanks/soakage pit were 2 cases (66.7%).

OUT OF FB, INGESTED FB WERE 9 CASES (64.3%),FB IMPACTED INTO EAR/NOSE WERE 4 CASES (28.6%) AND FB ASPIRATED 1 (7.1%) CASE. THE TYPE OF FB INVOLVED IS COIN IN 4 CASES(28.6%),TOYS/BUTTON BATTERIES 4 (28.6%) CASES, SAFETY PINS/SHARP OBJECTS 4 (28.6%) CASES AND VEGETABLE MATTER 1 (7.1%) AND OTHERS 1 (7.1%) WHICH WAS A CHALK PIECE IMPACTED IN THE NOSE.

Among the miscellaneous group electrocution accounted for 3 cases (20%) , wall collapse 3 (20%) , hit by moving objects 6 cases(40%) and prick by sharp objects 3 cases(20%).

Table VII place of occurrence

place of occurrence	**n**	**%**	**Chi- square test**
Inside the house	**78**	**43.3%**	**$\chi 2=18.1$ P=0.001 SIG**
Within the premise of house	**36**	**20.0%**	
School place	**7**	**3.9%**	
Play ground	**6**	**3.3%**	
Street	**48**	**26.7%**	

Others	**5**	**2.8%**	

On studying the place of occurrence of accidents , about 78 cases (43.3%) occurred inside the house,36(20%) cases occurred within the premise of house , 7(3.9%) cases in school place, 6 (3.3%) in play ground,48(26.7%) cases in street and roads and 5(2.8%) cases in other places.

Table VIII – Day of accident

day of week	type of accident													
	Fall		RTA		Burns		Poisoning		Foreign body		Others		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Sun	10	16.9%	10	25.0%	1	9.1%	7	18.4%	1	7.1%	7	38.9%	36	20%
Mon	15	25.4%	6	15.0%			6	15.8%	3	21.4%	1	5.6%	31	17.2%
Tue	6	10.2%	4	10.0%	2	18.2%	2	5.3%	1	7.1%	2	11.1%	17	9.4%
Wed	8	13.6%	6	15.0%	2	18.2%	5	13.2%	3	21.4%	1	5.6%	25	13.9%
Thu	5	8.5%	3	7.5%	2	18.2%	3	7.9%	4	28.6%			17	9.4%
Fri	9	15.3%	5	12.5%	3	27.3%	6	15.8%	1	7.1%	2	11.1%	26	14.4%
Sat	6	10.2%	6	15.0%	1	9.1%	9	23.7%	1	7.1%	5	27.8%	28	15.6%

$\chi 2=13.33$ P=0.05 significant

IN OUR STUDY, 36 CASES (20%) OCCURRED ON SUNDAY, 31(17.2%) ON MONDAY, 17(9.4%), 25(13.9%), 17(9.4%), 26(14.4%), 28(15.6%) CASES OCCURRED ON TUESDAY, WEDNESDAY, THURSDAY, FRIDAY AND SATURDAY RESPECTIVELY.

On comparing the type of accident with the day of occurrence falls were common on Monday 15(25.4%) cases, followed by Sunday and Friday with 10(16.8%),9(15.3%) cases respectively. RTA was common on Sunday 10 (25%) cases , burns on Friday 3 cases(27.3%),poisoning on Saturdays 9 cases (23.7%) , FB on Thursday 4 cases (28.4%) followed by Monday and Wednesday with 3 cases (28.4%) each.

Table IX Time of occurrence of accidents.

Time	Type of accident													
	Fall		RTA		Burns		Poisoning		Foreign body		Others		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
6 - 9 AM	9	15.3%	9	23.5%	1	9.1%	2	5.3%	3	21.4%	4	22.2%	26	14.4%
9 - 12 PM	13	22.0%	4	10.0%	5	45.5%	9	23.7%	1	7.1%	5	27.8%	37	20.6%
12 - 3 PM	13	22.0%	5	12.5%			5	13.2%	1	7.1%	1	5.6%	25	13.9%
3 - 6 PM	19	32.2%	15	37.5%	2	18.2%	15	39.5%	6	42.9%	6	33.3%	65	36.1%
6 - 9 PM	4	6.8%	5	12.5%	2	18.2%	4	10.5%	2	14.3%	2	11.1%	19	10.6%
9 PM-6 AM	1	1.7%	2	5.0%	1	9.1%	3	7.9%	1	7.1%			8	4.4%

$\chi 2=85.7$ P=0.001 significant

About 26(14.4%) cases in 6 – 9 AM, 37(20.6%) in 9 AM-12 Noon, 25(13.9%) cases in 12 Noon -3PM, 65 cases (36.1%) in 3-6PM ,19(10.6%) in 6-9PM and 8 cases (4.4%) in 9PM-6AM interval.

Falls were common in the time period between 3-6PM 19 cases (32.2%), RTA in 3-6Pm 15 cases (37.5%) , burns in 12Noon-3PM 5 cases (45.5%), poisoning in 15 cases(39.5%) and FB 6 cases (42.9%) at 3-6PM .

Table X – working day or holiday

n=100

	Type of accident													
	Fall		RTA		Burns		Poisoning		FB		Others		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Working day	21	56.8%	12	40.0%			1	16.7%	4	40.0%	1	8.3%	39	39%
Holiday	16	43.2%	18	60.0%	5	100.0%	5	83.3%	6	60.0%	11	91.7%	61	61%

$\chi 2$=4.84 P=0.01 significant

proportion with 95% CI 61%(51 – 70 %)

TOTAL NO OF ACCIDENTS WHICH OCCURRED ON WORKING DAY WERE 39(21.7%) CASES AND 61 (33.9%) CASES OCCURRED ON HOLIDAYS. OF THAT FALLS OCCURRED ON WORKING DAYS 21(56.8%) , 18 (60%) CASES OF RTA, 5(100%) CASES OF BURNS, POISONING 5 CASES (83.3%) AND FOREIGN BODY 6 (60%) CASES AND 11 CASES (91.7%) OF MISCELLANEOUS ACCIDENTS

OCCURRED ON HOLIDAYS. SCHOOL GOING

CHILDREN WERE ALONE ANALYZED.

Table XI-Time interval between accident and arrival to hospital

		n	%
time interval between accident and arrival	**< 1hr**	**118**	**65.6%**
	2 -24 hrs	**37**	**20.6%**
	2nd _7th day	**17**	**9.4%**
	7th day_1month	**5**	**2.8%**
	> 1 month	**3**	**1.7%**

In our study about 118 cases (65.6%) arrived to the hospital in less than 1 Hr, 37 cases (20.6%) in 2-24 Hrs, and 17 (9.4%) cases in 2-7 Days, 5 (2.8%) cases in 7 days to 1 month, 3 cases (1.7%) after 1 month.

Table XII- Injury pattern RTA and fall

Age group	**Injury pattern**						**Chi – square test**
	Soft tissue injuries		**Skeletal injury**		**Head injury**		
	n	**%**	**n**	**%**	**n**	**%**	
< 3 yrs	**7**	**24.1%**	**13**	**24.5%**	**11**	**35.5%**	**χ2=13.05 P=0.05 significant**
3- 6 yrs	**4**	**13.8%**	**21**	**39.6%**	**8**	**25.8%**	
6-9 yrs	**10**	**34.5%**	**13**	**24.5%**	**5**	**16.1%**	
9-12	**8**	**27.6%**	**6**	**11.3%**	**7**	**22.6%**	

On comparing the injury pattern with age group it was found that head injury was common in the age group of < 3 Yrs with 11 cases (35.5%),soft tissue injuries in 6-9Yrs age with 10 cases(34.5%) and skeletan injuries were common in the age group of 3-6 Yrs with 21 cases(39.6%) .

Table XIII-Head injury pattern

head injury pattern	n	%
Local injuries	29	85.3%
Intra cranial hemorrhage	3	8.8%
Skull fracture and Intra cranial hemorrhage	2	5.9%

AMONG THE HEAD INJURY CASES PATIENTS PRESENTING WITH LOCAL SCALP HAEMATOMAS AND LACERATION WERE 29(85.3%), 3(8.8%) CASES PRESENTED WITH INTRA CRANIAL HEMORRHAGE, NOT EVEN A SINGLE CASE WITH SKULL BONE FRACTURE ALONE AND TWO CASES (5.9%) PRESENTED WITH SKULL BONE FRACTURE COMBINED WITH INTRA CRANIAL HEMORRHAGE. OF THE OTHER INJURY DISTRIBUTION UPPER LIMB WERE INJURED IN 33 CASES (42.9%) AND LOWER LIMBS IN 39(50.6%) AND OTHER SITES INVOLVED IN 5(6.5%).

Table XIV-Morbidity pattern in other accidents

Morbidity Pattern		n	%
Burns	Trunk-Superficial	1	9.1%
	Trunk-Deep	1	9.1%
	Limbs-Superficial	1	9.1%

	Limbs- Deep	**4**	**36.4%**
	Combined	**4**	**36.4%**
Drowning	**Without complication**	**3**	**100.0%**
Poisoning	**Respiratory complication**	**8**	**21.1%**
	CNS complication	**2**	**5.3%**
	GIT complication	**3**	**7.9%**
	None	**25**	**65.8%**
FB	**Without complication**	**13**	**92.9%**
	With complication	**1**	**7.1%**
Others	**1**	**2**	**100.0%**

AMONG THE BURN PATIENTS IT WAS FOUND THAT SUPERFICIAL BURNS OF TRUNK OCCURRED IN 1 (9.1%) CASE AND DEEP BURNS OF TRUNK IN 1(9.1%) CASE, SUPERFICIAL BURN OF LIMBS IN 1 (9.1%) CASE AND DEEP BURN OF LIMBS AND COMBINED BURNS INVOLVING TRUNK, HEAD, LIMBS IN 4 (36.4 %) CASES EACH.ALL THE 3(100%) CASES OF NEAR DROWNING RECOVERED WITHOUT ANY COMPLICATIONS.

8 (21.1%) cases of poisoning developed respiratory, 2(5.3%) cases developed CNS and 3 (7.9%) cases developed GIT complications. About 25 (65.8%) cases of poisoning did not develop any symptoms or complications. FB ingestion/inhalation presented with complication in 1 (7.1%) and without any complications in 13(92.9%) cases.

Table XV – no of days of admission

Type of accident	N	Mean	Std. Deviation	Oneway ANOVA F-test
Fall	**25**	**6.04**	**3.857**	**F=6.09 P=0.001 Significant**
RTA	**38**	**21.13**	**17.981**	
Burns	**9**	**15.33**	**9.500**	
Drowning	**3**	**3.00**	**2.000**	
Poisoning	**37**	**6.19**	**10.105**	
Foreign body	**1**	**3.00**	**.**	

Others	**12**	**10.75**	**12.793**	
Total	**125**	**11.70**	**13.988**	

Of the total IP cases, the mean days of admission for all the cases were 11.7 days with SD of 13.98 and all the cases clustered around 5-6 Days .of those cases fall had a mean of 6.04days (SD 3.857), RTA 21.3 days (SD 17.981), burns 15.33 days (SD 9.50), drowning 3.0days (SD 2.00), poisoning 6.19 days (SD 10.105), FB 3.0 days and other cases a mean of 10.75 days (SD 12.793).

Table XVI-Outcome

Outcome	**native medicine**				**Chi - square test**
	Given		**Not given**		
	n	**%**	**n**	**%**	
Recovered completely	**10**	**71.4%**	**146**	**88.0%**	**χ^2=18.5 P<0.001 significant**
Temporary Residual deformity			**6**	**3.6%**	
Permanent Residual deformity	**4**	**28.6%**	**5**	**3.0%**	
Deaths			**2**	**1.2%**	
Discontinued treatment			**7**	**4.2%**	

Of the total no of cases 156(86.7%) recovered completely, 6 (3.3%) cases had temporary residual deformity which lasted for < 6 months which was correctable by surgery, 9(5%) cases recovered with permanent residual deformity i.e. deformity which lasted for > 6 months most of which were scars, amputations with loss of limb or finger, malunited fractures, death occurred in 2 (1.1%) cases and 7(3.9%) cases discontinued treatment or did not turn for follow-up.

On comparing the outcome with prior treatment with native medicine showed that the permanent residual deformity was more common 4 cases (28.6%) compared to 5 cases (3%) in whom native medicine was not given.

Table XVII-Outcome

Time of arrival	Outcome										Chi - square test
	Recovered completely		Temporary Residual deformity		Permanent Residual deformity		Deaths		Discontinued treatment		
	n	Row %	n	Row %	n	Row %	n	Row %	n	Row %	
< 1hr	103	87.3%	4	3.4%	5	4.2%	2	1.7%	4	3.4%	
2 -24 hrs	34	91.9%	2	5.4%					1	2.7%	
2nd _7th day	16	94.1%							1	5.9%	$\chi 2=68.67$ P=0.001 significant
7th day - 1month	3	60.0%			1	20.0%			1	20.0%	
> 1 month					3	100.0%					

ON COMPARING THE OUTCOME WITH TIME OF ARRIVAL TO HOSPITAL IT WAS FOUND THAT 103 CASES (87.3%) WHO ARRIVED TO HOSPITAL WITHIN 1 HR RECOVERED AND MAXIMUM WITHIN A DAY OF INJURY. ALL CASES THAT ARRIVED TO HOSPITAL AFTER 1 MONTH OF INJURY 3 CASES (100%) HAD PERMANENT RESIDUAL DEFORMITY.

Analysis of Social factors

Table XIX: Family Pattern

		n	%
Family pattern	Nuclear family	133	73.9%

	Joint family	47	26.1%
Parents living together/ Not	Parents living together	169	93.9%
	Single parent family	11	6.1%

AMONG THE FAMILY PATTERN 133(73.9%) CHILDREN CAME FROM NUCLEAR FAMILY AND 47(26.1%) CHILDREN FROM JOINT FAMILY. 11 CASES (6.1%) OCCURRED IN CHILDREN FROM SINGLE PARENT FAMILY AND 169 (93.9%) CASES OCCURRED IN FAMILIES WITH BOTH PARENTS LIVING TOGETHER.

Table XX – Age of mother

Type of accident	Age of Mother								Chi -square test
	< 25 yrs		26-30 yrs		31-35 yrs		>35 yrs		
	n	%	n	%	n	%	n	%	
Fall	19	33.3%	28	37.3%	10	29.4%	2	14.3%	
RTA	10	17.5%	12	16.0%	12	35.3%	6	42.9%	
Burns	4	7.0%	5	6.7%	1	2.9%	1	7.1%	$\chi 2=16.82$ P=0.54 Insignificant
Drowning			2	2.7%	1	2.9%			
Poisoning	16	28.1%	16	21.3%	4	11.8%	2	14.3%	
Foreign body	4	7.0%	5	6.7%	4	11.8%	1	7.1%	
Others	4	7.0%	7	9.3%	2	5.9%	2	14.3%	

WHEN MOTHER'S AGE WAS < 25 YRS THE MOST COMMON ACCIDENT NOTICED WERE 19(33.3%) CASES OF FALL AND 16(28.1%) CASES OF POISONING FOLLOWED BY RTA 10(17.5%).WHEN

MOTHERS AGE WAS 26 – 30 YRS THE SAME PATTERN AS PREVIOUSLY MENTIONED WAS NOTICED . WHEN MOTHERS AGE WAS 31-35YRS THE MOST COMMON ACCIDENT WAS RTA 12(35.3%) CASES FOLLOWED BY 10(29.4%) CASES OF FALL AND RTA 6(42.9%) CONTINUED TO BE THE MOST COMMON ACCIDENT IN CHILDREN WHOSE MOTHER WERE > 35 YRS.

Table XXI- education status of mother

Type of accident	Education status of Mother											
	Illiterates		Primary		Middle		High school		Higher secondary		Professional	
	n	Col %	n	Col %	n	Col %	n	Col %	n	Col %	n	Col %
Fall	17	28.8%	10	34.5%	18	40.9%	10	37.0%	4	20.0%		
RTA	15	25.4%	6	20.7%	8	18.2%	6	22.2%	5	25.0%		
Burns	3	5.1%	3	10.3%	1	2.3%	3	11.1%	1	5.0%		
Drowning					1	2.3%	1	3.7%	1	5.0%		
Poisoning	9	15.3%	6	20.7%	12	27.3%	6	22.2%	5	25.0%		
Foreign body	7	11.9%	2	6.9%	3	6.8%	1	3.7%	1	5.0%		
Others	8	13.6%	2	6.9%	1	2.3%			3	15.0%	1	100.0%

$\chi 2=32.6$ P=0.36 Insignificant

AMONG CHILDREN OF ILLITERATE MOTHERS 17(28.8%) CASES OF FALL AND 15(25.4%) CASES OF RTA OCCURRED. IN PRIMARY SCHOOL MOTHERS FALLS WERE COMMON WITH 10(34.6%) CASES FOLLOWED BY RTA AND POISONING WITH 6(20.7%) CASES EACH. IN MOTHERS OF MIDDLE

SCHOOL FALLS PREDOMINATED WITH 18(40.9%) CASES FOLLOWED BY 8 (18.2%) CASES OF RTA AFTER POISONING 12 (27.3%) CASES.

In mothers of high school education falls again predominated 10(37%) followed by RTA and poisoning with each 6(22.2%) cases. In mothers of higher secondary education RTA and poisoning predominated with 5(25%) cases each followed by 4(20%) of falls.

Table XXII-Working status of mother

Type of accident	Mother Working				Chi -square test
	Working		not working		
	n	Col %	n	Col %	
Fall	18	37.5%	41	31.1%	$\chi 2$=6.33 P=0.33 Insignificant
RTA	10	20.8%	30	22.7%	
Burns	3	6.3%	8	6.1%	
Drowning	1	2.1%	2	1.5%	
Poisoning	5	10.4%	33	25.0%	
Foreign body	6	12.5%	8	6.1%	
Others	5	10.4%	10	7.6%	

The following table gives the pattern of accidents in working and non working mothers, which shows 48(26.7%) in the first group and 132 (73.3%) in the second group. Among working mothers 4(8.3%) were working within the house, 5(10.4%) working less than 4 Hrs, 5 (10.4%) mothers with 4-8 Hrs work and 19(39.6%) working more than 8 Hrs.

Table XXIII-Socio economic status of family

Socio economic status	n	%
Class II	**3**	**1.7%**
Class III	**50**	**27.8%**
Class IV	**123**	**68.3%**
Class V	**4**	**2.2%**

The modified Kuppuswami socio economic scale[15] was used for socio economic stratification. 3 cases (1.7%) of accidents occurred in children of class II, 50(27.8%) in class III, 123(68.3%) in class IV and 4 (2.2%) in class V.

Table XXIV – Birth order of affected child

Birth order of affected child	n	%
1	**58**	**32.2%**
2	**98**	**54.4%**
3	**19**	**10.6%**
4	**5**	**2.8%**

Among children affected by accidents in our study 58(32.2%) were of first order birth, 98(54.4%) second order, 19(10.6%) third order and 5(2.8%) above third order.

Table XXV – Average birth spacing

Average birth spacing	n	%
<3 yrs	121	67.2%
3-6 yrs	36	20.0%
>6 yrs	23	12.8%

Among children affected by accidents 121(67.2%) families had birth spacing of < 3 Yrs, 36 (20%) 3-6yrs and 23(12.8%) families with spacing more than 6 Yrs.

Table XXVI – Alcohol abuse in father

Alcohol abuse	n	%
Yes	**69**	**38.3%**
No	**111**	**61.7%**

Alcohol abuse in family was associated with 69(38.3%) cases and 111(61.7%) was not associated with alcohol abuse in any family members.

Table XXVII

	No. of children	Sig.	OR(95% CI)
Family system			
Nuclear family	133	**.049**	**2.232(1.004-4.961)**
Joint family	47		
Parents living together Yes	169	.640	.851(.434-1.670)
Age of mother			
<25Yrs	57	**.046**	**1.252(1.085-3.025)**
> 25Yrs	123		
Education status-mother			
Illiterate –middle school	132	.792	.963(.728-1.274)
High school& above	48		
Mother working			
Yes	48	.489	1.365(.566-3.293)
No	132		
Substance abuse			
Yes	69	.247	.656(.322-1.340)
No	111		
Socio economic status			
Class I & II	3	**.231**	**1.603(1.064-3.379)**

	No. of children	Sig.	OR(95% CI)
Class III & above	173		
Birth order child **First** **Second** **Third and above**	 58 98 24	.578	1.335(.48-3.698)

The various social factors were analyzed as risk factors for accidents using multivariate logistic regression analysis and was found that nuclear family had Odd's ratio of 2.232(95% CI 1.004-4.961), age of mother < 25 Yrs with Odd's ratio 1.252 (95% CI 1.085-3.025) and socio economic class III and IV together with Odd's ratio 1.603 (95% CI 1.064-3.379)

DISCUSSION

Of the 180 cases in our study during the period of Sep 2006 to Aug 2007, 31.1% were treated as outpatients & 68.9% were treated as inpatients. The difference in IP & OP may be due to the fact that children with major injuries requiring investigation and intervention alone were included and majority of these children required hospitalization.

The age of occurrence of accidents were 37.8% in children < 3 Yrs, 28.3% in 3 - 6 Yrs age group,19.4% in 6 - 9 Yrs and 14.4% in 9 - 12 Yrs.

The mean age in Years is 5.194 yrs (S.D. 3.4yrs) with minimum of 10 days & maximum age of 12 yrs.

Age Group	**Murdock et al[31] 1971 - 1973**	**Present study 2006 - 2007**
<3 Yrs	64.5%	37.8%
3 – 6 Yrs	19.3%	28.3%
6 – 9 Yrs	10.1%	19.4%
9 – 12 Yrs	7.3%	14.4%

On comparing our study with that of Murdock et al[31], the children in each group differed, but the children < 3 Yrs were commonly affected which was similar to the study compared.

Sex Distribution

Male children affected were 60% and female children were 40%.

Studies	Boys	Girls
Tandon et al[43] 1987 – 88	69%	30.9%
Murdock et al[31] 1971 – 73	57%	47%
Mc Queens et al[29] 1959 – 60	55%	45%
B.M.A Survey[8] 1966 – 64	59%	41%
Navascues et al[32] 1995 – 98	68%	32%
Present study 2006 – 07	60%	40%

In our study, males outnumbered females which was similar to previous studies 60% (Range 49 – 69%).

Type of accidents

Among the accidents, falls accounted for 32.8% cases which were commonest, followed by RTA 22.2% second commonest, followed by poisoning 21.1%, Foreign Body 7.8%, Burns 6.1%, Drowning 1.7% and others 8.3% in the decreasing order of frequency.

Type of accident	Tandon et al[43] 1987 - 88	Carter et al[9] 1991 Jan-Dec	Present study 2006 - 07
Falls	47.4%	67%	32.8%
RTA	26.2%	5.9%	22.2%
Burns	11.5%	5.0%	6.1%
Poisoning	6.3%	5.0%	21.1%
Drowning	1.0%	-	1.7%
FB	1.4%	5.8%	7.8%
Others	4.5%	-	8.3%

Falls were the commonest type of accident in our study which was similar to that of Murdock et al[31], Markus hubacher et al[27] and Sitaraman et al[41].

Burns occurred in 6.1% of total cases in our study which was similar to that of Carter et al[9] , but was in contrast to that of Mc Queens et al[29] who reported 28.5% of burns and Tyser et al[44] 24.7% burns in their studies.

In our study falls were higher in the age group of 6 – 9 Yrs and RTA were common in the age group of 9 – 12 Yrs. Poisoning were common in children < 3 Yrs and FB in children 3 – 6 Yrs age which was statistically significant.

Among RTA, pedestrian injuries were common 47.5% followed by motor vehicle occupant injuries 39.5% and Bi-Cycle injuries 12.5% which was statistically significant. Pedestrian injuries were common in the age Group of 6 – 9Yrs which was similar to that of Antony ryan et al[1] study.

Among poisoning hydrocarbon and kerosene oil ingestion accounted for 42% of cases and was the commonest poisoning followed by chemical poisoning 28.9%, corrosives 7.9% and tablet poisoning 2.6% which was statistically significant. Kerosene oil ingestion was the commonest poisoning in studies by Sitaraman et al[40] and Basudeb Chatterji et al[5] which was comparable with the present study.

Among thermal injuries, scalds accounted for 72.7% cases and were the commonest burn injury followed by fireworks and house fires 27.3%.

Drowning occurred in soakage pits and water storage tanks in 66.7% and bath tubs in 33.3%.

Among Foreign body, FB swallowed was 64.3% which was the commonest occurrence, followed by FB impacted in ear and nose 28.6% followed by FB in tracheo bronchial tree 7.1%.

Among miscellaneous cases, hit by moving objects like bat and ball were common 40% followed by electrocution and wall collapse 20% each.

Among the foreign body coin was present in 28.6% cases ,safety pins and sharp objects in 28.6% cases , toys and button batteries in 28.6% followed by vegetable matter in 7.1%. The statistics were insignificant and was in contrast to the study by Asif et al[2] in which Peanut was the commonest foreign body.

Place of occurrence

Significant number of accidents 63.3% occurred in and around home, followed by 26.7% in streets and roads, 3.9% in schools and 3.3% in playground. Home was the commonest place of occurrence of accident in our study which is similar to Tandon et al[43] 58.7% and Carter et al[9] with 79.2% accidents in home.

Day of occurrence of accidents

Among the total no of accidents 20% accidents occurred on Sunday followed by Monday (17.2%),Saturday(15.6%) and Friday(14.4%) which was statistically significant. On analyzing the individual accidents, falls were common on Monday, RTA on Sunday, Burns on Friday, Poisoning on Saturday and FB on Thursday which was insignificant statistically. This was in contrast to the studies by Murdock et al[31] and carter et al[9] which showed no preponderance to any particular day of the week.

Time of occurrence

Accidents were common in the time period of 3 – 6 PM with 36.1% cases followed by 9 AM – 12 Noon with 20.6%. 3 – 6 PM coincides with children returning from school and spending more time on play, which was statistically significant. On analyzing the individual type of accidents, falls were common 32.2% in 3 – 6 PM, RTA 37.5% in 3 – 6 PM followed by 9 – 12 Noon (17.5%), burns in 12 Noon – 3 PM, poisoning in 12 AM – 3 PM and FB in 3–6 PM which was statistically insignificant, these data differed in different studies as shown:

Studies	Time
Carter et al[9] 1991 Jan-Dec	6 – 7 PM
Lynn Walton et al[26] 1991 – 99	3 – 6 PM
Tandon et al[43] 1987 – 88	12 noon – 6 PM
Murdock et al[31] 1971 – 73	9 AM – 12 noon
Mc Queens et al[29] 1959 – 60	10 AM – 12 noon
BMA Survey[8] 1966 - 67	9 AM – 12 noon
Present study	3 – 6 PM

Total of 39% accidents occurred on working days and 61% of accidents on holidays which was statistically significant. On analyzing the individual accidents falls alone were common on working days and all other accidents occurred on holidays which were statistically significant.

Time interval between accident and arrival to hospital

After the occurrence of the accident 65.6% of cases reached hospital within 1 Hr of injury and 85% of cases within 24 Hrs. About 1.7% of cases turned up after 1 month probably after taking native treatment.

Morbidity – Injury pattern

Among injury pattern in RTA & fall, skeletal injuries accounted for (49.9%), followed by head injury (27.43) and soft tissue injuries (25.615).head injury is more common in the age group of children< 3 Yrs (35.5%) and skeletal injuries are more common in the age group of 3-6 Yrs (39.6%) and soft tissue injuries in 6-9Yrs (34.5%) which is statistically significant.

In the study by Tandon et al[43] head injury was the major consequence of fall which was similar to our study.

In the study by Markus hubacher et al[27] open wounds accounted for 22%, fractures 19% and contusion and bruises 18%.

Among head injury cases 85.3% of cases were local scalp haematomas and laceration with small amount accounting for intracranial bleed and skull bone fractures. Among burns, the most common site involved was limbs and deep burns were more common than superficial burns. Poisoning presented with no systemic manifestations in 65.8% cases, followed by respiratory manifestations in 21.1% cases. Near Drowning presented with no complications and FB was mostly swallowed and passed out of GIT without any complications in 92.9% cases.

Hospital stay

Of the total IP cases the mean days of admission were 11.70 days with SD of 13.988 days with minimum of 1 day and a maximum of 76 days. The longest hospital stay was for RTA 21.3 days (SD 17.98), followed by burns 15.33 days (SD 9.50), fall 6.04 days (SD 3.859), poisoning 6.19 days (SD 10.105) and FB 3.0 days which is statistically significant.

In the study by Navascues et al[32] the average length of hospital stay was 4.5 days, range of 1 – 93 days.

Outcome

Statistically significant number of cases 86.7% recovered completely with no complications, 5% had permanent residual deformity lasting for more than 6 months, temporary residual deformity in 3.3% cases and death in 1.1% and 3.9% cases discontinued treatment or did not return for follow-up .Mortality is 1.1% slightly higher than that of Navascues et al[32] which showed 0.5% and the mortality in the study by Tandon et al[43] was 53.1/1000 cases.

The permanent residual deformity was more 28.6% in cases were native medicine was given compared to 3% in the group in which native medicine was not given which is statistically significant. The reason for this may be that native medicine may delay the start of treatment and lead to deformities or by itself may produce complications.

ON COMPARING THE OUTCOME WITH TIME INTERVAL BETWEEN ACCIDENT AND ARRIVAL TO THE HOSPITAL IT WAS FOUND THAT 87.3% CASES RECOVERED COMPLETELY WHEN ARRIVED WITHIN 1 HR OF ACCIDENT. WHEN CONSIDERING THE

PERMANENT RESIDUAL DEFORMITY IT WAS FOUND THAT 100% OF CASES WHO REACHED HOSPITAL AFTER 1 MONTH OF OCCURRENCE OF INJURY HAD PERMANENT DEFORMITY COMPARING TO THOSE WHO TURNED EARLIER , WHICH IS STATISTICALLY SIGNIFICANT.

Analysis of social factors

Family pattern

About 73.9% cases come from nuclear families and 26.1% from joint families. This was similar to the studies by Ravinder gupta et al[33] in which 60% of cases were from nuclear families and 40% from joint families. 6.1% cases were from single parent families and 93.9% cases from families in which both parents were living together. This was in contrast to the study of Carter et al in which single parent families accounted for 14% of cases but similar to that of Murdock et al[31] with 8% and Heycock et al[20] in 7.8% cases from single parent families.

Age of mother

In children of mothers less than 25 Yrs of age the most common accident was fall (33.3%) followed by poisoning. The same pattern was followed in mothers of age group 26 – 30 Yrs , but RTA was predominant in mothers of age group 30 and above and these statistics were insignificant.

Educational status of mother

In children of illiterate mothers falls predominated followed by RTA (25.4%) and poisoning (15.3%). In children born to mothers of primary school education the same pattern was followed as mentioned previously. In children of mothers with higher secondary school education RTA and poisoning predominated 25% each followed by falls 20% and these statistics were insignificant. These data were similar to that of Ravinder gupa et al[33] in which 53% of mothers were illiterates, 25% undergraduates and 22.5% graduates.

Working status of mother

About 26.7% of cases occurred in children of working mothers and 73.3% cases occurred in children of unemployed mothers which was statistically insignificant. Most of these mothers worked for a time period of 4-8 Hrs. This was in contrast to the study by Carter et al[9] who showed that 45% of mothers were employed and Ravinder gupta et al[33] in which 54% of mothers were employed. These statistics could not be interpreted properly as the population statistics for employed mothers in our community is not available.

Socio economic class

Study	Class III	Class IV
Murdock et al[31] 1971 – 73	65.3%	24.2%
Mc Queens et al[29] 1959 – 60	32%	49.6%
Present study	27.8%	70.5%

On comparing the other studies grouping accidents in Class III and IV totally accounted for most of the accidents studies which was the same in all studies.

Birth order of affected children

The second child was most commonly affected by accidents in 54.4%, followed by first child in 32.2% ,children above second order were least affected. This may be due to the fact that most families would be a two child family.

Average birth spacing

67.2% of accidents occurred in families with inadequate birth spacing (< 3 Yrs) compared to 20% in families with adequate birth spacing (3 – 6 Yrs) and 12.8% (>6 Yrs).

Alcohol abuse

Alcohol abuse was found in 38.3% of families compared to the study of Carter et al who found that 50.5% families had one or both parents smoking/ taking alcohol.

The statistics on birth order, birth spacing and socio economic class could not be interpreted without any case control study or population statistics based on our community.

Using multivariate logistic regression analysis various factors were analyzed as risk factors for accidental injuries. It was found that nuclear families had two times the risk of accident with odd's ratio of 2.232 (95% of confidence interval 1.004 – 4.961), mothers age < 25 Yrs was associated with OR 1.252 (95% CI 1.085 – 3.025) and accidents were common in children of low socio economic class of modified Kuppuswami scale 3 and 4 with OR 1.603 (95% CI 1.044 – 3.379)

Other factors like education status of mother, working status of mother, single parent families, alcholism substance abuse in family, birth order of affected children did not have any statistical correlation as risk factors for accidental injuries.

CONCLUSION

1. Accidents were more common in the age group of children < 3 Yrs.

2. Males are more commonly involved than girls in any type of accident.

3. Falls are most common accidents followed by RTA and poisoning. Falls and poisoning are common in children < 3yrs and RTA was common in the age group of 6 – 9 Yrs.

4. Pedestrian injuries are more common among RTA, scalds common among thermal injuries and swallowed FB is more common than impacted or aspirated FB.

5. 63% of accidents occur in home followed by roads 26.7%.

6. Accidents were more common in the weekends and clustered around Sunday and Monday and most of the accidents occurred around 3–6 PM.

7. Head injury was common in children younger than 3 Yrs and local scalp injuries were common than intra cranial bleeds. Lacerations and fractures accounted for majority of wounds in older children.

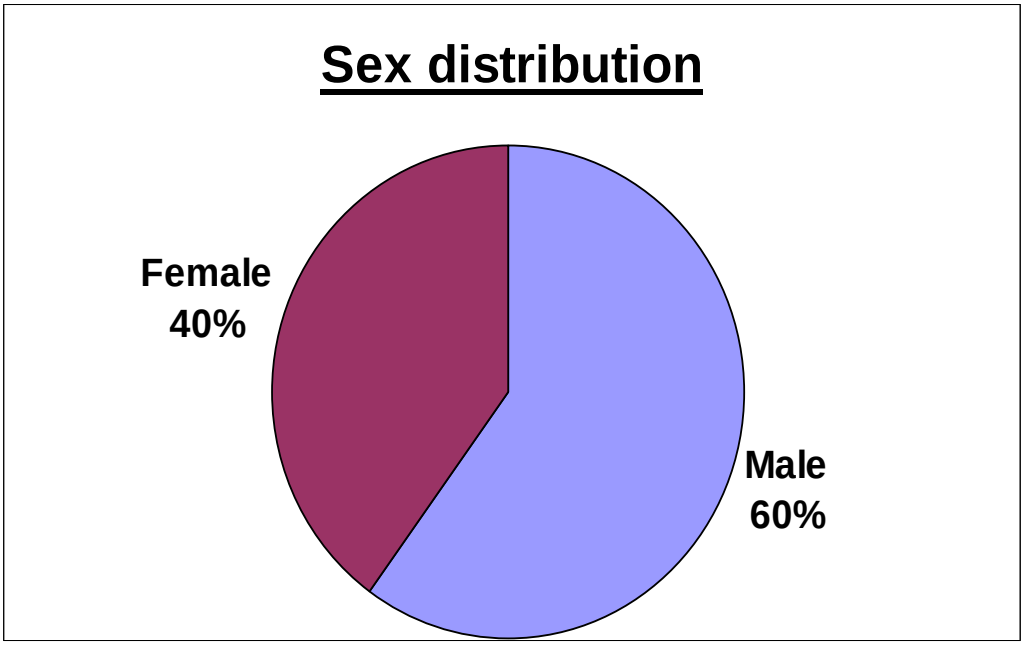
8. The mean number of days of admission was 11.7 days.

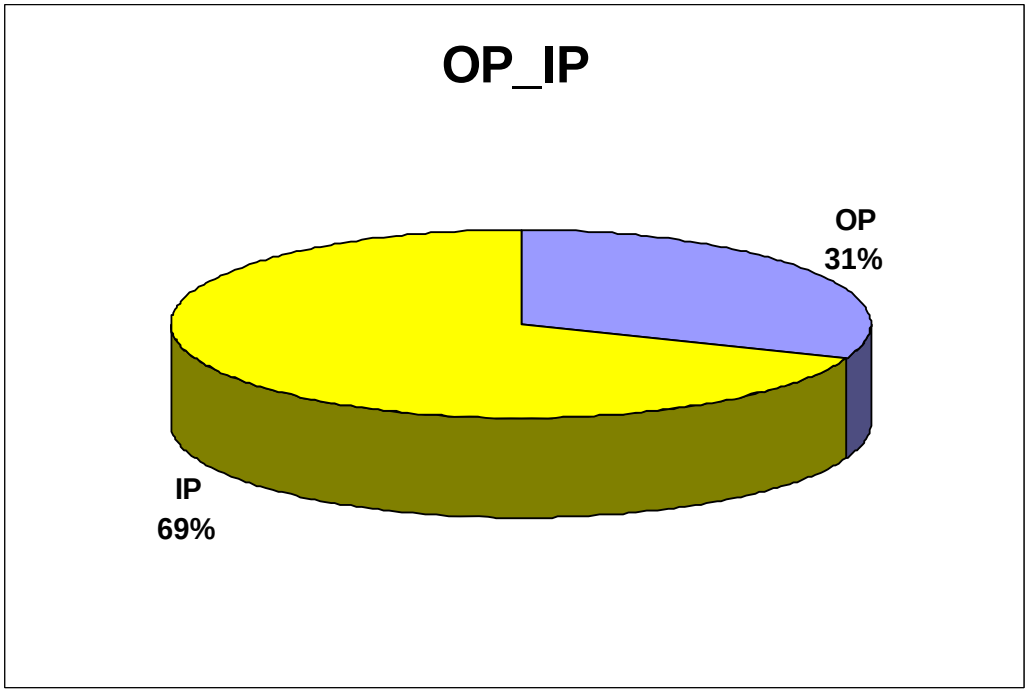
9. 86.7% cases recovered completely and mortality was 1.1%.

10. Accidents were more common in children from nuclear families, mother with age group < 25 Yrs and coming from lower socio economic class.

11. Accidents were more common in second birth order children and in families with inadequate birth spacing.

12. Prevention strategies need to be implemented through education, change in environment, empowerment and enforcement to bring down the rate of accidents which costs more lives and leaves children with functional impairment, psychological stress and financial burden to the family and nation.


Sex distribution
Female
40%
Male
60%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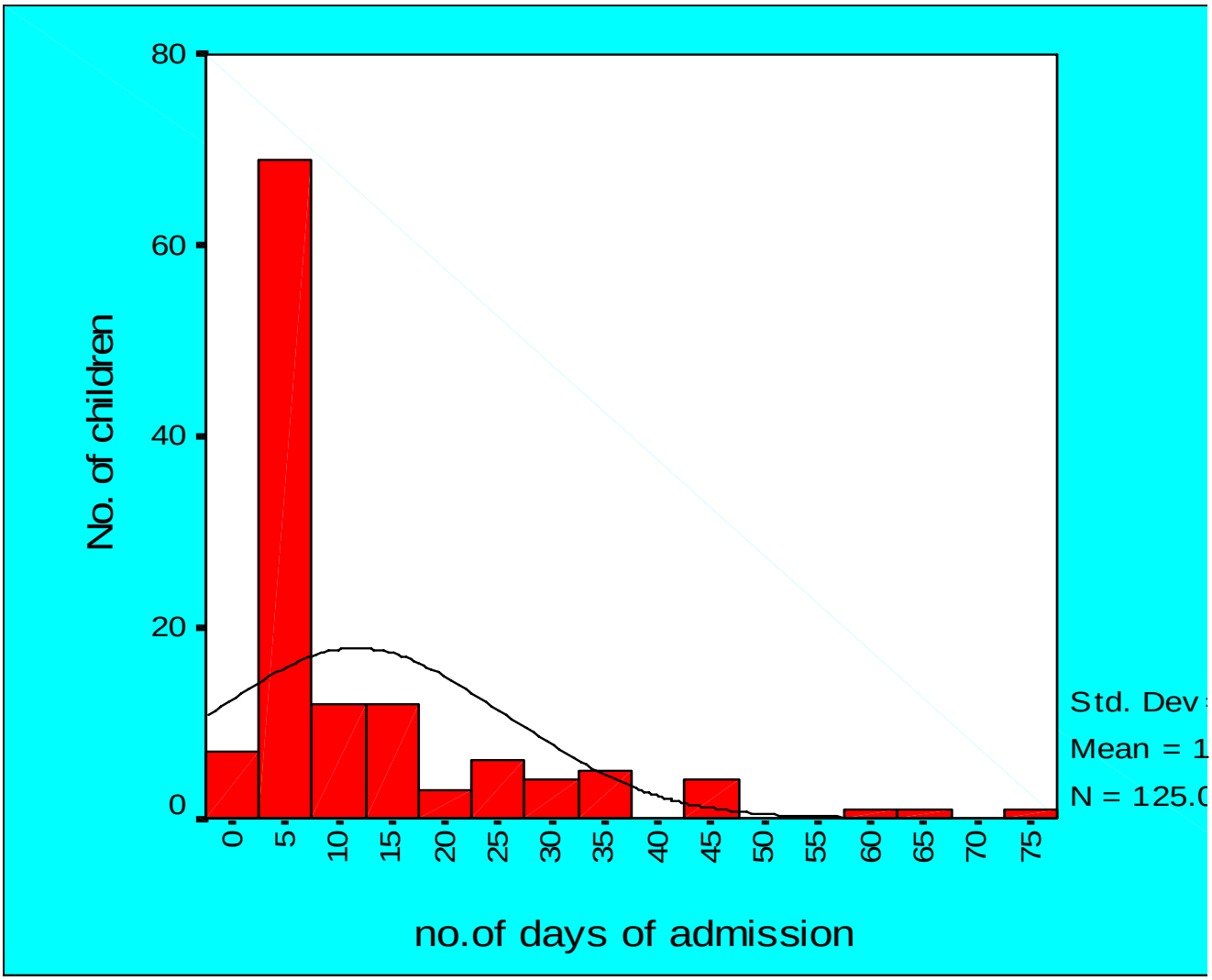
80
60
40
20
0
No. of children
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
no.of days of admission
Std. Dev
Mean = 1
N = 125.0

KEY TO MASTER CHART

Sex: male = 1, female = 2

OP/ IP: OP = 1, IP = 2

Type of accident: Fall = 1, RTA = 2, Burns = 3, Drowning = 4, Poisoning = 5, Foreign body = 6, others = 7.

Details of accident – fall: At the same level = 1, from one level to another = 2, Stairs = 3, Terrace = 4, from moving objects = 5, others = 6.

Details of accident- RTA: Pedestrian injuries =1, Bicycle injuries = 2, Two wheeler Accidents = 3, Four wheeler Accidents = 4, While transition into & out of Vehicles = 5, others = 6.

Details of accident- Burns: fire wounds = 1, Scalds = 2.

DETAILS OF ACCIDENT- DROWNING: **BATH TUB = 1, SOAKAGE PITS/ WATER STORAGE TANKS = 2, OTHER WATER SOURCES = 3.**

Details of accident- poisoning: Hydrocarbon = 1, Chemical = 2, Tablet = 3, Corrosives = 4, others = 5.

Details of accident- FB: FB swallowed = 1, FB impacted in nose & ear, FB aspirated = 3.

Details of accident- others: Electrocution = 1, Wall collapse/ fall by standing objects = 2, Hit by moving objects = 3, Prick by sharp objects = 4, others = 5.

Type of FB: Coin = 1, Parts of toys / Button Batteries = 2, Safety pins/ sharp objects = 3, Vegetative matter = 4, others = 5.

Place of occurrence of accident: Inside the house = 1, within the premises of House = 2, School = 3, Play Ground = 4, Street / Road = 5, others = 6.

Day of the week: Sunday =1, Monday = 2, Tuesday = 3, Wednesday = 4, Thursday = 5, Friday = 6, Saturday = 7.

Time of occurrence of the accident: 6 -9 AM = 2, 9 AM – 12NOON = 3, 12 NOON – 3 PM = 4, 3-6 PM = 5, 6-9 PM = 6, 9 PM – 6 AM = 7.

Working day or not: Working day = 1, Holiday = 2.

Time interval between accident & arrival to hospital: < 1 hr = 1, 2 – 24 hrs = 2, 2^{nd} day – 7^{th} day = 3, 7^{th} day – 1 month = 4, > 1 month = 5.

Native medicine given or not: Given = 1, Not given = 2.

No. of injuries: Single = 1, Multiple = 2.

Injury pattern: Cuts/ bruises = 1, Laceration / Degloving injury = 2, Amputations / Crush injuries = 3, Sprains / Hemarthrosis = 4, Dislocation / Subluxation = 5, Blunt injury abdomen / Internal Hge = 6, Head injury = 7, Fractures = 8, Lacerations & Fractures = 9, Prick with sharp objects = 10, others = 11.

Head injury pattern: Local Hematoma with no internal bleed = 1, Intracranial Hemorrhage = 2, Fracture skull bone = 3, Fracture and Intracranial Hemorrhage = 4.

Injury distribution : Upper limb = 1, Lower limb = 2, Limb & trunk = 3, other sites = 4, Multiple = 5.

Morbidity pattern in burns: Face, head & neck, superficial burns = 1, Face, head & neck, deep burns = 2, Trunk, superficial burns = 3, Trunk, deep burns = 4, Limb, superficial burns = 5, Limb, deep burns = 6, combined = 7.

Morbidity pattern in Drowning: Without complications = 1,with complications= 2.

Morbidity pattern in poisoning: Respiratory complications = 1, CNS = 2, GIT = 3, Hematologic / Metabolic = 4, None = 5, Others = 6.

Morbidity in FB : Without complications = 1, With complications = 2.

OUTCOME**: RECOVERED COMPLETELY = 1, TEMPORARY RESIDUAL DEFORMITY = 2, PERMANENT RESIDUAL DEFORMITY = 3, DEATH =4, DISCONTINUED TREATMENT = 5.**

Family pattern: Nuclear family = 1, Joint family = 2.

Parents living together or not: Parents living together = 1, Parents separated & child living with father = 2, Parents separated & child living with mother = 3, Death of father = 4, Death of mother = 5.

Education status of parents: Illiterate =1, Primary school = 2, Middle school = 3, High school =4 , Higher secondary school =5, Graduate = 6, Professional = 7.

Working mother / not : Working = 1, Not working = 2.

HOURS OF WORK**: INDOOR = 1, < 4 HRS OF WORK = 2, 4-8 HRS = 3, > 8HRS = 4.**

ALCHOHOL USE IN FATHER **: YES = 1, NO = 2.**

ABBREVIATION

IP	**–**	**Inpatient**
PTS	–	Pediatric trauma score
RTA	–	Road traffic accident
GCS	–	Glascow coma scale
BSA	–	Body surface area
FB	–	Foreign body
OR	–	Odd's ratio
CI	–	Confidence interval
SD	–	Standard deviation
ICP	–	Intra cranial pressure
SCIWORA	–	Spinal cord injury without Radiologic abnormalities
ABG	–	Arterial blood gas

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PROFORMA

"PROFILE OF ACCIDENTAL INJURIES AND POISONING IN CHILDREN AND ANALYSIS OF THE PREDISPOSING FACTORS"

NAME:

AGE: SEX:

ADDRESS:

Date of first hospital visit as OP/IP:

Mode of injury: fall from height

Road traffic accident

Burns

Drowning

Bites

Poisoning

FB ingestion

Details of type of accident:

Place of occurrence of accident:

Inside the house

Within the premises of house

Outside the house- At school place

At play ground

At work place

Person accompanying the injured child during the accident:

None

Parents

Grandparents

Neighbour

Relatives

Child's friends

Day & time of accident:

Was it a working day or holiday:

Time interval between the incident & arrival to hospital:

Any native medicine given before arrival to hospital:

Morbidity:

Outcome: Recovered completely

With residual deformity- temporary

Permanent

Death

No.of days of admission:

Nuclear family/ joint family:

Parents living together or not:

If not living together: divorced

Death of spouse

Left the family

No.of family members:

Family details: Age of parents

Age of siblings

Death of siblings if any & cause

Morbidity in parents or siblings if any:

Average birth spacing:

Socio economic status:

Parents' education status:

Father smoker/ alchoholic:

Mother working or not:

If working hours of work:

Members helping the mother in caring the child at home:

Grand parents

Relatives/ neighbours

Servantmaid

Day care worker

Elder siblings